CLAIMS

1. A method for manufacturing a functional layer, wherein a substrate (1; 101) is introduced into a process chamber (2; 102), wherein at least one plasma (P) is generated by at least one plasma source (3; 103), such as for instance a plasma cascade source, wherein at least one deposition material (A) is deposited on the substrate (1; 101) under the influence of the plasma (P), wherein, at the same time, at least one second material (B) is applied to the substrate with the aid of a second deposition process, wherein the functional layer has no catalytic function.

2. A method according to claim 1, wherein the said first deposition material (A) is supplied to the plasma (P) outside the at least one plasma source (3; 103) in the process chamber (2; 102).

3. A method according to claim 1 or 2, wherein at least one volatile compound of the said first deposition material (A) is supplied to the plasma (P) for the purpose of the deposition.

4. A method according to claim 3, wherein the volatile compound contains at least one precursor material which decomposes the material to be deposited in the process chamber (2; 102) before the material has reached the substrate (1; 101).

5. A method according to any one of the preceding claims, wherein the second deposition process has been chosen from the group comprising PECVD, CVD, PVD, such as sputtering, hollow-cathode sputtering, vapor deposition optionally using boats, e-beam, and optionally supported by an ion process, ion plating, microwave deposition, ICP (inductive coupled plasma), parallel-plate PECVD, optionally honey comb electrode structures, and the like.

6. A method according to any one of the preceding claims, wherein at least one sputtering electrode (6) comprising the said deposition

material (A, B) is arranged in the process chamber (2), wherein the plasma (P) is brought into contact with said sputtering electrode (6) to sputter the substrate (1) with the material (A, B) of the electrode (6).

7. A method according to claim 6, wherein the plasma (P) is passed at least partly through at least one passage of the at least one sputtering electrode (6) to contact the plasma with the electrode (6).

8. A method according to claim 7, wherein the sputtering electrode (6) contains compressed powders of the said materials (A, B) to be deposited on the substrate (1).

9. A method according to any one of the preceding claims, wherein the substrate (101) comprises sheet material.

10. A method according to any one of the preceding claims, wherein the substrate (101) is moved in the process chamber (102) at least in such a manner that each time a different part of the substrate (101) contacts the plasma (P).

11. A method according to any one of the preceding claims, wherein the substrate (101) is brought from an environment into the process chamber (102) and is discharged from the process chamber (102) to the environment while the deposition material is deposited on the substrate (101) in the process chamber (102).

12. A method according to at least claim 1, wherein the substrate (1; 101) is substantially non-porous and is, for instance, a metal or plastic, such as for instance a metal plate, a plastic sheet or a plastic film.

13. A method according to any one of the preceding claims, wherein the substrate (1; 101) comprises at least one carrier material (B).

14. A method according to any one of the preceding claims, wherein the substrate (1; 101) comprises at least one metal and/or alloy.

15. A method according to any one of the preceding claims, wherein the substrate (1; 101) comprises corrugated material.

16. A method according to at least claim 1, wherein the substrate (1; 101) is substantially porous.

17. A method according to any one of the preceding claims, wherein the deposition material (A, B) is deposited such that the chemical composition of the deposited material measured over distances of 5 cm, preferably over a distance of 10 cm, more particularly over a distance of 20 cm, differs by less than 10%, particularly less than 5% and more particularly less than 1%.

18. A method according to any one of the preceding claims, wherein the substrate (1; 101) is adjusted to a particular electrical potential, for instance by DC, pulsed DC and/or RF biasing.

19. A method according to any one of the preceding claims, wherein the substrate (1; 101) is adjusted to a particular treatment temperature.

20. An apparatus for manufacturing a functional layer on a substrate, wherein the apparatus is provided with at least one plasma source (3; 103), such as for instance a plasma cascade source, to generate at least one plasma (P), wherein the apparatus comprises means (6, 7) for introducing a first deposition material (A) into each plasma (P), wherein the apparatus is further provided with substrate positioning means (8; 118) for bringing and/or keeping at least a part of a substrate (1; 101) in such a position in a process chamber (2; 102) that the substrate (1; 101) contacts said plasma (P), wherein the apparatus is provided with a second deposition source, which second deposition source is arranged to deposit at least one second deposition material (B) on the substrate (1; 101) at the same time as the plasma source, wherein the functional layer is no catalytically active layer.

21. An apparatus according to claim 20, wherein the second deposition source is a VD source, such as for instance a CVD source, a PVD source, a PECVD source.

22. An apparatus according to claim 20 or 21, wherein the second deposition source is arranged for carrying out one of the following deposition

processes: PECVD, CVD, PVD, such as sputtering, hollow-cathode sputtering, vapor deposition optionally using boats, e-beam, and optionally supported by an ion process, ion plating, microwave deposition, ICP (inductive coupled plasma), parallel-plate PECVD, optionally honey comb electrode structures, and the like.

23. An apparatus according to claim 21, wherein the second deposition source comprises at least one sputtering electrode (6) containing deposition material (A, B) to be deposited, wherein the sputtering electrode is positioned such that, during use, the plasma (P) generated by the at least one plasma source (3) sputters material (A, B) from the sputtering electrode (6) onto the substrate (1).

24. An apparatus according to claim 23, wherein each sputtering electrode (6) is arranged downstream of the at least one plasma source (3), while at least one sputtering electrode (6) is provided with at least one plasma passage to allow the plasma (P) to pass from the source (3) to the substrate (1).

25. An apparatus according to claim 23 or 24, wherein the sputtering electrode (6) abuts the plasma source (3).

26. An apparatus according to any one of claims 20-25, wherein the apparatus is provided with at least one fluid supply channel (7; 120) to supply a material to be deposited, being in a volatile state, to the plasma (P).

27. An apparatus according to at least claims 23 and 26, wherein the at least one sputtering electrode (6) is provided with the said fluid supply channel.

28. An apparatus according to at least claim 20, wherein the apparatus is provided with at least two plasma cascade sources (103, 103') to generate at least two plasmas (P, P'), wherein these plasma cascade sources (103, 103') and the substrate positioning means (118, 118') are positioned such that, during use, opposite sides of the substrate (1; 101) contact the

plasmas (P, P') generated by those cascade sources (103, 103') to deposit material on the opposite sides of the substrate (101).

29. An apparatus according to at least claim 20, wherein the apparatus is provided with a substrate supply roller (110) and discharge roller (111), respectively, for supply and discharge, respectively, of a substrate (101) that can be rolled up, such as a web and/or sheet-like substrate, to and from the process chamber (102), respectively.

30. An apparatus according to at least claim 20, wherein a wall (104) of the process chamber (102) is provided with at least one passage (105) to pass the substrate (101) into and/or out of that chamber (102).

31. An apparatus according to claim 30, wherein at least a part of the at least one passage (105) of the process chamber wall (104) is bounded by oppositely arranged feed-through rollers (106), which feed-through rollers (106) are arranged to engage a part of the substrate (101) disposed between them during use, for the purpose of the feed-through of the substrate (101).

32. An apparatus according to at least claim 31, wherein the apparatus is provided with deformation means (112) to deform the substrate (101) which has unrolled from the supply roller (110).

33. An apparatus according to claim 32, wherein the deformation means (112) are arranged to corrugate and/or serrate the substrate (101).

34. An apparatus according to at least claim 20, wherein the apparatus is provided with means for vapor-depositing material on the substrate (1; 101).

35. An apparatus according to at least claim 20, wherein the apparatus is provided with at least one separate sputtering source (121) for sputtering material onto the substrate (101).